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ABSTRACT

The evaluation process within special education, as in general education, most often becomes one of data collection consisting of formal and informal tests given by the school psychologist and the classroom instructor. Influences of the complex environment on the educational process are often ignored. Evaluation factors include mainstreaming, instructors, materials, curricula concerns, and common needs. A model for organizing and managing educational data is needed which will go beyond the clinical perspective into an overview and boundary identification of the variables and their interactions within the educational environment. A systems theory approach can be used to identify these variables to determine the boundaries that define the system. Formal approaches to system boundary identification in special education have been studied by Clark and Yacobacci (1978), based on Forrester's DYNAMO technique. Their model focused on determination of critical elements providing academic success and social information for mainstreamed hearing-impaired students. The classroom instructor does not have the time or facilities to pursue systems thinking and boundary identification so rigorously. However, the concept of systems thinking and design for special education evaluation procedures is supported. A focus away from the strict clinical model of evaluation is needed. An eight-item bibliography is included. (Author/LMM)

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EVALUATION: BOUNDARY IDENTIFICATION IN THE NON-LINEAR SPECIAL EDUCATION SYSTEM

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INTRODUCTION

The complexity of social systems with human and non-human, living and on-living elements presents a myriad of interrelationships and interactions which are complex, causal, and non-direct in their effects on environmental status. One aspect of our modern social system is the formal education process with its particular theoretical stances, settings, trained personnel, and young ones to be nurtured into the society. How well does formal education perform and achieve its role? For that matter, what is the role of formal education? Who makes the decisions within the "system" and society? What and how much information for the decision makers? What is the validity and reliability of this data? Who makes the judgements and for what purposes? These are questions very pertinent to the educational evaluator; the person who must search through the myriad of interrelationships, variables, and their interactions for useable information. The structure and purpose of this symposium is the exploration into a particular paradigm for organizing, obtaining, and managing information relative to formal educational systems; distinctly, the educational systems which provide services to students with special needs.

In most special educational settings, the classroom teacher is the principle decision maker for the individuals within his or her charge. It is the classroom teacher who decides the methods and materials of instruction, who decides referral needs for special services or testing; who manages and records student progress; and who provides major input to the decision of future placement and needs of these students. Since training for most special educators reflects a clinical approach to evaluation, these educators

tend to focus on diagnostics and performance indicators relative to individual students. The purpose and primary focus of this symposium is directed to these primary decision makers - the classroom teachers whose distinctive roles propel them to function as educational evaluators. The authors wish to provide a model for organizing and managing educational data which will go beyond the clinical prospective (that of data pertinent only to each individual student) into an overview and boundary identification of the myriads of variables and their interactions withing the educational environment.

CONSIDERATIONS WITHIN THE SPECIAL EDUCATIONAL ENVIRONMENT

Special education is a term used to categorize the provision and delivery of instruction and programming which differs from the "regular" educational setting (Hallahan and Kauffman, 1978). The students who are serviced through special educational programming are often described as exceptional children. Within this rubric of "exceptionality" exists a number of categories which generally depicts the nature of the exceptionality. Kirk (1972) lists the following six categories used for classification of these children with special needs:

1. mental characteristics,
2. sensory abilities,
3. neuromuscular or physical charateristics,
4. social or emotional behaviors,
5. communication abilities,
6. multiple conditions of the above categories.

The incidence of exceptionality has been estimated to be twenty percent of the current school population (Gearheart and Weishahn, 1976). This most likely being a very conservative estimate, in that the sited authors also indicated that approximately sixty percent of all school aged children would

benefit educationally from some form of special services. No matter what the incidence or classification of exceptionalities; it still remains that the design of instruction, the components of programming, and the education of instructors to meet these special needs are an integral part of the general educational system.

Within the current framework of special education, several factors should be considered. As listed above, the educational setting appropriate for an individual must be determined. This procedure is usually initiated through a battery of testing situations and in some cases diagnostic observations. All resulting in a particular educational placement for this individual. Until the mid seventies of this century, most exceptional children were grouped for educational purposes with others who had the same characteristics (Hallahan and Kauffman, 1978). In cases of severe disability, these children were often placed in residential settings away from the general society, some appropriately and some not. The Federal mandate, Public Law 94-142, issued in 1976 has been termed the All Handicapped Children's Act and calls forth from each State an accountability of educational programming for all exceptional children through the Individual Educational Plan (IEP) which is a written document depicting the goals and instructional services for each child. In additional to the IEP, the Legislature also mandated that the "least restrictive educational environment" be provided for each individual. This provision has lead to the current mainstreaming issues in special education. Whereby, the term mainstreaming meaning placement within a general educational setting, has given rise to a continuum of alternative educational programs available to this population. This continuum ranges from complete residential placement to placement within a regular classroom with no special services provided. This mainstreaming

issue is a viable factor in the evaluation of educational services provided exceptional children.

Other factors relevant to the special educational setting are knowledgeable instructors, specifically designed instructional materials, curricula concerns, and communication needs. Although differing educational philosophies and managerial approaches for the instruction of exceptional children exist, special considerations abound within each theoretical framework no matter which special category is being addressed. An instructor must know the needs of a partially sighted child as opposed to the needs of a totally blind child; the needs of a hard of hearing child verses a profoundly deaf child; or the needs of a child in a wheelchair verses a child on crutches. In most situations adaptation in communication and in instructional materials is necessary for the special child to process the information given.

The evaluation process within special education, or general education for that matter, most often becomes one of data collection consisting of formal and informal tests given by the school psychologist and the classroom instructor. Placement decisions and predictions of educational attainment are generated from this data. Often ignored are the influences of the complex environment on the educational process. A widely used definition of evaluation is the gathering of information for decision making (Tenbrink, 1974). Other evaluators put emphasis on the process rather than a product (Cooley and Lohnes, 1976). Within this framework decisions must be made as to what variables and relationships among these variables are necessary for a purposeful evaluation process to occur. For the special educator, evaluation of pupil performance cannot just be "scores" listed on a profile. Evaluation of pupil performance should take into consideration the interactive variables within the exceptional child's living environment. One theoretical

prospectus for variable identification is protrayed in systems theory, or what is sometimes referred to as "General Systems Theory" (Laszlo, 1972). In systems theory, variables interact with each other to a greater or lesser degree for the maintanence of the system. It is the determination of the critical variables that define a system (such as an ecological system, an economic system, and now a social system) that is difficult. What variables produce a cause and effect relationship? What variables must be included in the definition of a particular system? Answering these questions is the process of determining the boundaries that define the system of consideration. Since the social system is among the most difficult to define, and since education can be viewed as a mini-system with the larger context of the social system, the remainder of this paper will focus on the "boundary" identification of a special education setting with the main-streaming factor a determining feature of the system.

BOUNDARY IDENTIFICATION ----AND THEN WHAT?

Refinement of the supra-system (society) into the sub-system of education and then into the sub-sub-system (special education) is similar to teaching the concepts of relationships in beginning set theory in modern mathematics. It is a process of deciding what elements share common properties and what elements do not exhibit those common properties. Some elements can be grouped in more than one set; thereby, the grouping produces a sub-set of the two orginal sets, and so on. As a small child's mind becomes confused and entangled in the sub-sub set operations, so does the adult mind become entangled with the delineation of the myriad of variables operating within the subset of a larger set which becomes a "system". At this point, one constructs a mental model of elements

and intuits the nature of their relationships (Root, 1977). Since the human mind cannot hold every variable or element interacting in even a sub-sub-system and cannot determine every influential factor of each variable, the mental models are of necessity abstractions of the real environment. In the process of abstracting critical elements, it is possible for one to lose significant information. Therefore, mental models must be shared in written form, discussed and validated as to the representation of reality.

A system, as defined by Banathy (1968) is an assemblage of parts that are designed and built into organized wholes for the attainment of specific purposes. When constructing a mental model of special education into system components, one must realize that the purpose of special education is the provision of opportunities for individuals to obtain their full human potential. With this then being the goal, the individual variables and elements can be modelled into organized units representing the system and its boundaries.

A more formal approach to system boundary identification in special education, particularly the education of hearing impaired children, was studied by Clark and Yacobacci (1978). This approach reached beyond the representation of a mental model and portrayed the special educational program as a system with dynamic interrelating variables. This model construction was based on Forrester's previous work in modelling urban settings using a specialized computor program termed DYNAMO (1969).

This DYNAMO technique portrays the interaction of designated system variables and their effects over estimated time intervals. Thereby, illustrating cause and effect relationships in a non-linear form. If the underlying model is perceptually correct in relationship to reality, then the prediction characteristics of the interactive components should hold true over time.

The focus of the Clark and Yacobacci model was the determination of critical elements which provided academic success and social integration for hearing impaired students who would be mainstreamed along some point of the continuum mentioned previously. In order to produce the boundaries of this particular educational and construct a realistic model for computor analysis, the following procedures were conducted. First, thirty professionals in the field of education for hearing impaired children were identified. Each person was asked to participate in this study. Fifteen replied positively. The second step involved the use of a modified Delphi Technique, a series of mailings, to identify the elements which would enhance academic achievement and faciliate social integration for mainstreamed hearing impaired students. The first mailing was open-ended in that the researchers asked each subject to identify ten critical elements for each category. When this information was received, the researchers then grouped the items according to similarity. The second mailing called for consensus to item similarity and for rank ordering the elements from most crucial to least effective. (refer to page 8 for listing).

ELEMENTS THAT CONTRIBUTE TO ACADEMIC ACHIEVEMENT

1. QUALITY OF SUPPORT SERVICES
2. QUALITY OF SPECIALIZED FACILITIES
3. REGULAR CLASSROOM TEACHER COMPETENCE
4. DEGREE OF INDIVIDUALIZATION
5. QUALITY OF STUDENT ASSESSMENT
6. QUALITY OF ADMINISTRATIVE SUPPORT AND SUPERVISION
7. AMOUNT OF INSERVICE TRAINING
8. FAMILY INVOLVEMENT
9. QUALITY OF LANGUAGE DEVELOPMENT CURRICULUM
10. COHESIVENESS OF CURRICULUM
11. FACILITATION OF PEER RELATIONSHIPS
12. SUITABILITY OF ADAPTED MATERIALS FOR THE HEARING IMPAIRED
13. QUALITY OF EARLY CHILDHOOD PROGRAM
14. QUALITY OF ACADEMIC CURRICULUM
15. CONSISTENCY OF COMMUNICATION MODE
16. PROVISION FOR EXTRACURRICULAR ACTIVITIES
17. QUALITY OF ON-GOING PROGRAM EVALUATION
18. RATIO OF IN-REGULAR-CLASS SCHOOL TIME TO OUT-OF-REGULAR CLASS TIME
19. FACILITATION OF SELF-RELIANCE
20. LEVEL OF TEACHER/CHILD COMPATIBILITY

ELEMENTS THAT CONTRIBUTE TO SOCIAL INTEGRATION

1. FACILITATION OF SELF- RELIANCE
2. FACILITATION OF POSITIVE SELF-CONCEPT
3. ORGANIZATION OF CURRICULAR OPPORTUNITIES FOR SOCIAL INTEGRATION
4. FACILITATION OF PEER RELATIONSHIPS
5. DEGREE OF INDIVIDUALIZATION
6. DEVIATION FORM CHRONOLOGICAL AGE FOR PLACEMENT
7. QUALITY OF COMMUNICATION ENVIRONMENT
8. IN CLASS/OUT OF CLASS RATIO
9. LEVEL OF TEACHER CHILD COMPATIBILITY
10. QUALITY OF EARLY CHILDHOOD PROGRAM
11. FAMILY INVOLVEMENT
12. QUALITY OF SUPPORT SERVICES
13. QUALITY OF PRACTICAL LIVING PROGRAM
14. LEVEL OF ATTENTION TO AFFECTIVE DOMAIN

Subjects were also asked to list "indicators" of both academic achievement and social integration. Once these lists were refined, they were then asked to weight each of the indicators according to effect on these two categories. When the researchers asked the subjects to construct a cross-impact matrix, the number of active participants dwendled from fifteen to six. The matrix elements were as follows:

1. Family Involvement
2. Language Development
3. Academic Curriculum
4. Communication Mode
5. Support Services
6. Teacher Competence
7. Self-concept
8. Self-reliance
9. Environment
10. Peer relationships
11. Achievement
12. Integration

The subjects were to indicate the cause and effect relationship that each had on the other.

From these six respondants, the information listed by three individuals was selected for model constuction. The researchers first constructed a representation verbally. Then from this verbal model, a model depicting DYNAMO terms

and format was drawn (See Figure I). At this point the computor equations were written to depict this model. Numerous sensitivity computor runs were conducted. During these runs, particular variables were manipulated by adjusting them in multiplicatives of 2, 3, and .5. An example of the computor runs is shown on page 11. This example illustrates the most impressive run obtained during this modelling process. That is, when self-concept was doubled, most of the other variables were positively influenced and the levels for academic achievement and social integration stablized for the stated time period.

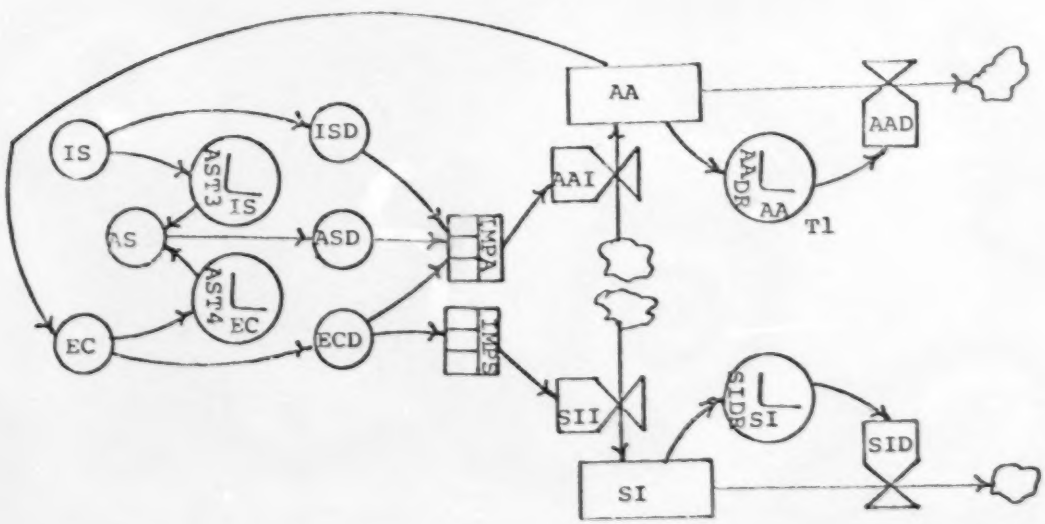

Figure 1. Enriched model including both Academic Achievement and Social Integration.

VERSION 1: Facilitation of Self-Reliance doubled.

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AA=A,SI=S,AM=1,CM=2,EC=3,EN=4,IZ=5,PR=6,SC=7,SR=8

50.000      60.000      70.000      80.000      90.000  AS
 0.000       5.000      10.000      15.000      20.000  12345678
 0.0A 1 - - - - . - - - - - . - - - - - . - - - - - . AS,12345678
    A 1         .           .           .           . AS,12345678
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10.0A 1 -8- - - . - - - - - . - - - - - . - - - - - . AS,1234567
    A 1  8      .           .           .           . AS,1234567
    A 1  8      .           .           .           . AS,1234567
    A 1  8      .           .           .           . AS,1234567
    A 12 8      .           .           .           . AS,234567
    A  12 8     .           .           .           . AS,134567
    A  12 8     .           .           .           . AS,1345,267
    AS 1 2 8    .           .           .           . 1345,267
    AS 1362 8   .           .           .           . 34,15,27
    AS 143 672  .           .           .           . 45,28
20.0.AS 143 6 -72 - - - - - . - - - - - . - - - - - . 45,78
    .A S1453 6  .87 2       .           .           .
    . A S1453 6 .  8 7   2  .           .           .
    .  A 1S 53 6.    8   7 2.           .           . S4
    .    A1 5536.      8   .72          .           . 14
    .     1A  56S        8.    72       .           . S3,14
    .     41 A 53  S       8     2      .           . 56,27
    .     41   53A     S   .8    27     .           . 56
    .     41   53   A      S8    27     .           . 56
    .     41   53      A   .8   S27     .           . 56
30.0. - - 41- -53 - - - - A .8- - 27-S- . - - - - - . 56
    .     41   53          .A    27    .S          . 56,A8
    .     41   53          .8 A  27    .  S        . 56
    .     41   53          .8   A27    .    S      . 56
    .     41   53          .8    A7    .      S    . A2,56
    .     41   53          .8    2A    .       S   . 56,A7
    .     41   53          .8    2A    .        S  . 56,A7
    .     41   53          .8    2A    .        S  . 56,A7
    .     41   53          .8    27A   .        S  . 56
    .     41   53          .8    27A   .         S. 56
40.0. - - 41- -53 - - - - - .8- - 27A - . - - - - -S. 56
    .     41   53          .8    27A   .         S. 56
    .     41   53          .8    27A   .         S. 56
    .     41   53          .8    27A   .         S. 56
    .     41   53          .8    27A   .         S. 56
    .     41   53          .8    27A   .         S. 56
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NOW --- AND THEN WHAT????

It is very evident that the classroom instructor does not have the time or the facilities to pursue systems thinking and boundary identification in this rigious fashion. However, the members of this symposium support the concept of system thinking and design for use in the evaluation procedures and processes reletive to student performance in any educational setting, particulary the special educational setting. A focus away from the strict clinical model of evaluation must be accomplished. It is to this point that Dr. Mark Alter addresses his concerns by developing the 6-S paradigm to illustrate evaluation parameters in the special educational setting. Then Dr. Marjorie Goldstein will elaborate on one particular system element, the curriculum; as will Sr. Francis Solano elaborate on the component of formal testing.

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